

## **Multiplication Strategies (Repeated Addition/Arrays) – A Day at the Zoo**

Brief Overview:

**Students will use the multiplication strategies of repeated addition and the arrays model. They will apply either strategy to solve various real-life problems. All work will be centered around a zoo theme.**

NCTM Content Standard/National Science Education Standard:

### **Standard 6: Numbers and Operations**

- **Understand various meanings of multiplication.**
- **Understand effects of multiplying whole numbers.**

Grade/Level:

**Grade 3-4**

Duration/Length:

**Three 60-minute periods**

Student Outcomes:

### **Students will:**

- **Use different multiplication strategies: repeated addition and arrays.**
- **Apply those strategies to solve various problems.**

Materials and Resources:

### **Lesson 1**

- **Amanda Bean's Amazing Dream, A Mathematical Story by Cindy Neuschwander**
- **One set of Cuisenaire rods for each pair of students**
- **Overhead Cuisenaire rods**
- **One die for each student**
- **Teacher Resource 1 "Multiplication Models," transparency and one copy for each student**
- **Student Resource 1 "Repeating Rods," transparency and one copy for each student**
- **Student Resource 2 "Boxes and X's," one for each student**
- **Student Resource 3 "Addition and Multiplication Pictures," one for each student**
- **Student Resource 4 "Addition and Multiplication Numbers," one for each student**

## Lesson 2

- Snap cubes
- Gallon plastic bags (one for each pair) with a number written on the front  
Possible numbers: 24, 36, 48, 16, 12, 20
- Betcha by Stuart J. Murphy
- Teacher Resource 2 “Visual Discovery,” transparency
- Teacher Resource 3 “Sample Arrays,” transparency and cut apart
- Teacher Resource 4 “Animals for the Cages,” cut apart; one animal for each pair
- Student Resource 5 “Centimeter Grid Paper,” two for each pair
- Student Resource 6 “Design a Cage,” one for each student

## Lesson 3

- 3 large index cards
- Timer
- Teacher Resource 5 “I Have, Who Has?”
- Station 1
  - Colored pencils
  - One paper clip per partner
  - Teacher Resource 6 “Directions”
- Copy and cut apart
- Place each station direction on an index card at the station
  - Student Resource 7 “Cage Challenge Game Board”
- Station 2
  - 5 bowls labeled with the numbers 1, 2, 3, 4, and 5
  - Snap cubes
  - Double sided counters
  - One paper clip per partner
  - Teacher Resource 7 “At the Zoo Problems”
- Copy (you will need about 5 for each bowl)
- Cut apart, fold and place the problem in the correct number bowl
  - Teacher Resource 6 “Directions”
  - Student Resource 8 “Spinner”
- Station 3
  - One die per partner
  - Teacher Resource 6 “Directions”
  - Student Resource 9 “Boxes and X’s Recording Sheet”

## Lesson 1-3

- Use Teacher Resource 8-12 to check student answers.

Development/Procedures:

Lesson 1

Pre-Assessment/Launch -

- Explain to students that they will be reading a book about Amanda Bean, a girl who loves to count.
- Explain that many of the objects that Amanda Bean counts come in groups. Have students make a list of objects that come in groups as they listen to the story.
- After reading the story, give students time to add other “groups” to their list.
- Have students share their responses.

#### Teacher Facilitation –

- Explain that multiplication can be represented in two ways: repeated addition and as an array.
  - Display the transparency Teacher Resource 1, “Multiplication Models” to show the two ways to represent multiplication.
  - Point out that repeated addition uses equal groups.
  - Tell students that they will be using Cuisenaire rods to solve problems using equal groups.
  - Have the students explore with the Cuisenaire rods to discover the value of each rod. The students should arrange all ten rods in a stair step formation. Let them keep this on their desk to help with assigning values of each rod.
  - Display Transparency of Student Resource 1, “Repeating Rods.” On the transparency, show students a blue rod.
  - Ask them to represent rod trains that equal a blue rod. All rods used by students must be the same color.
  - Demonstrate the answers on the Transparency.
    - 1 Blue = 3 lime green because  $3 + 3 + 3 = 9$  or
    - 3 groups of 3 = 9 or  $3 \times 3 = 9$ .
    - 1 Blue = 9 White because  $1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 = 9$
    - 9 groups of 1 = 9 or  $9 \times 1 = 9$ .
- (Remind students that there may be more than one correct answer.)

#### Student Application –

- Distribute a set of rods to each pair of students.
- Have students complete Student Resource 1, “Repeating Rods,” after reviewing the example at the top of the page.
- Circulate around the room and observe student responses.
- Collect all materials before Embedded Assessment.

#### Embedded Assessment –

- **Demonstrate one example of Student Resource 2, “Boxes and X’s.”**
- **Roll one die and draw that many boxes. Roll the die a second time and place that many x’s inside each box. Write the appropriate addition, words, and multiplication sentences. (Example: First roll is a 3 and the second roll is a 2. Draw 3 boxes with 2 x’s in each box.**
  - **Addition=  $2 + 2 + 2 = 6$**
  - **Words = 3 groups of 2 = 6**
  - **Multiplication =  $2 \times 3 = 6$**
- **Pass out Student Resource 2 “Boxes and X’s” and one die to each student.**

### Reteaching/Extension –

- For those who have not completely understood the lesson, Review using Student Resource 3, “Addition and Multiplication Pictures.” See Teacher Resource 9 for answers.
  - View Animal Legs: <http://www.beaconlearningcenter.com/WebLessons/AnimalLegs/default.htm>
- For those who have understood the lesson, extend using Student Resource 4, “Addition and Multiplication Numbers.” Answer key can be found on Teacher Resource 10.
  - View Relationship of Multiplication to Addition: [http://www.aaastudy.com/g4\\_39\\_x2.htm](http://www.aaastudy.com/g4_39_x2.htm)

## Lesson 2

### Pre-Assessment/Launch -

- Place Teacher Resource 2 “Visual Discovery” on the overhead.
- Pose the questions one at a time to the students. This will get the students’ minds thinking and exploring different ideas.
- Give multiple students a chance to share their response for each question.

### Teacher Facilitation –

- **Show the picture of the chairs in Teacher Resource 3, “Sample Arrays,” to the students.**
- **Ask: What do you notice about the picture?**
  - **Example: The objects are in rows and columns.**
- **Say, “This is an example of an array. An array is an arrangement of objects in rows and columns.”**

- **Ask: How many rows of chairs are there? Remind the students that rows go horizontally. (4 rows)**
- **Ask: How many columns of chairs are there? Remind the students that columns go vertically. (5 columns)**
- **Ask: How many chairs are there all together? (20 chairs)**
- **Say, “The name for this array is 4 x 5 or 4 groups of 5. The product is 20, which is the amount of chairs.”**
  - **At this point you can relate repeated addition that they learned earlier to the concept of multiplying the amount of rows by the amount of columns.**
- **Show the students the other pictures of real life arrays one by one and have them name the array.**
  - **Egg carton 2 x 6**
  - **Window 5 x 4**
  - **File 2 x 1**
  - **Soda Cans 4 x 6**
  - **Pencil Points 5 x 6**
- **Have the students identify arrays around the room.**
- **Show the picture of the chairs again to the students.**
- **Ask: Is there another way to arrange the chairs?**
  - **Have students discuss with the students around them and use snap cubes to create the possible arrangements.**
  - **Have students come to the board and draw their other arrangements.**
- **Explain to the students that one product can have several different arrays.**
- **Show the “Visual Discovery” again and see if they can recognize any new mathematical concepts**
  - **The students should realize that the animal pictures are in an array.**

#### **Student Application –**

- **Say, “Now that you are familiar with arrays, you have a very important job to complete today. The animals at the zoo need new cages and, it is your responsibility to create their cage.”**
- **Ask: What do you notice about the cages at the zoo?**
  - **Answers will vary.**
- **Say, “Our zoo does not have a lot of room, so it is important to keep your cage in the shape of a square or a rectangle because they take up the least amount of room. You are going to use snap cubes to create a small scale of your cage.”**
- **Place the students into pairs and give each pair a bag that contains the following contents: number of snap cubes that match the number on the bag, picture from Teacher Resource 4, “Animals for the Cages,”**

Student Resource 5 “Centimeter Grid Paper,” and the bag labeled with the size of the cage.

- Say, “I am going to give you a bag that has the animal, the size of the cage, centimeter grid paper, and snap cubes. Use the snap cubes to create the shape, square or rectangle, of the cage. There are many different options for each animal. Record the different cage designs that are possible for your designated size and label the cage with the dimensions of the array (ex. 4 x 5) on your centimeter grid paper.”
- Circulate around the room as the students create their different arrays. Give the students plenty of time to record all of their different arrays.
- Say, “Now that you have explored many different cage options, pick the most appropriate cage for your animal and have it displayed for the Gallery Walk.”
- Have the students go on a Gallery Walk around the room to see the different cages. If time is permitted, let the students share their cages and explain why they choose that particular shape.

Embedded Assessment –

- Have the students complete Student Resource 6, “Design a Cage” worksheet. They are expected to draw, write the array, and explain why they chose that array for their cage.

Reteaching/Extension –

- Review repeated addition and arrays.
- Read Betcha by Stuart J. Murphy.
- Visit the websites below to review arrays:
  - Rectangle Multiplication:  
[http://nlvm.usu.edu/en/nav/frames\\_asid\\_192\\_g\\_2\\_t\\_1.html](http://nlvm.usu.edu/en/nav/frames_asid_192_g_2_t_1.html)
  - Multiply It:  
<http://www.mathcats.com/microworlds/multiplyit.html>
  - Multiplication Rods:  
[http://www.mathcats.com/microworlds/multiplication\\_rods.html](http://www.mathcats.com/microworlds/multiplication_rods.html)

Lesson 3.....

Pre-assessment/Launch

- Distribute a card from Teacher Resource 5, “I Have, Who Has?” Game to each student. (This game was developed by Baltimore County Public Schools)

- Designate a student to begin and read their card aloud. The student that has the next card reads their card aloud. This continues until you return to the first person.
  - Example:
  - First person says, “I have 32. Who has  $4 \times 4$ ?” Next person answers, “I have 16. Who has  $7 \times 3$ ?” Continue until, “I have 32” is read again.
- Collect the cards.

#### Teacher Facilitation –

- Say, “The past two days we have been learning two different strategies for multiplication, arrays and repeated addition. Today you are going to get a chance to travel through different parts of the zoo and practice those strategies.”
- Read the directions from Teacher Resource 6, “Directions” and demonstrate each station.
- Divide the students into three groups and have them select a partner from their group.
- Say, “You will have 15 minutes at each station. When the timer rings, rotate clockwise to the next station. Remember to leave the station the way you found it. All of the work will be collected at the end of each rotation.”

#### Student Application –

- Rotate through the stations.
- Circulate around as the students are working at the stations.
- Bring the students back together after the third rotation.
- Discuss the different strategies that were used and which strategy worked best for each station.

#### Embedded Assessment –

- Students will be assessed by the written work they turn in after each station.

Reteaching/Extension –

- Visit the website provided:  
<http://www.beaconlearningcenter.com/WebLessons/AnimalLegs/default.htm>
- <http://www.mathcats.com/microworlds/multiplyit.html>

Summative Assessment:

**Have the students complete Student Resource 10, “A Fish a Day.” Assess the students on their ability to answer the first part correctly and properly explain their reasoning. Answers can be found on Teacher Resource 11.**

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**Student Resource 1**

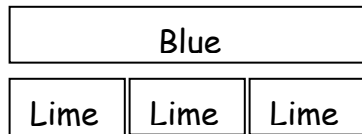
Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Repeating Rods**

For each rod below, draw the rods that will make the same length. Label each rod by color. Write the number sentences on the lines.

Example:

**Addition Number Sentence:**                       $(3 + 3 + 3 = 9)$ **Multiplication Number Sentence:**  $(3 \times 3 = 9)$ 

<div>1. <div style="border: 1px solid black; padding: 5px; text-align: center; margin: 10px 0;">Orange</div>  <b>Addition Number Sentence:</b> _____  <b>Multiplication Number Sentence:</b> _____</div>	<div>2. <div style="border: 1px solid black; padding: 5px; text-align: center; margin: 10px 0;">Brown</div>  <b>Addition Sentence:</b> _____  <b>Multiplication Number Sentence:</b> _____</div>
<div>3. <div style="border: 1px solid black; padding: 5px; text-align: center; margin: 10px 0;">Dark Green</div>  <b>Addition Number Sentence:</b> _____  <b>Multiplication Number Sentence:</b> _____</div>	<div>4. <div style="border: 1px solid black; padding: 5px; text-align: center; margin: 10px 0;">Red</div>  <b>Addition Number Sentence:</b> _____  <b>Multiplication Number Sentence:</b> _____</div>

**Challenge: How many ways can you represent the number 36 as repeated additions?  
Record your answer below.**

## Student Resource 2

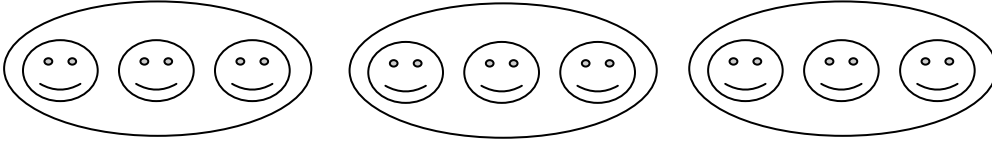
### Boxes and X's

<b>Game 1</b>	<b>Game 2</b>
<b>Draw:</b>	<b>Draw:</b>
<b>Addition:</b>	<b>Addition:</b>
<b>Word:</b>	<b>Word:</b>
<b>Multiplication:</b>	<b>Multiplication:</b>
_____ x _____ =	_____ x _____ =
<b>Game 3</b>	<b>Game 4</b>
<b>Draw:</b>	<b>Draw:</b>
<b>Addition:</b>	<b>Addition:</b>
<b>Word:</b>	<b>Word:</b>
<b>Multiplication:</b>	<b>Multiplication:</b>
_____ x _____ =	_____ x _____ =

# Addition and Multiplication Pictures

Complete the addition number sentence and the related multiplication number sentence.

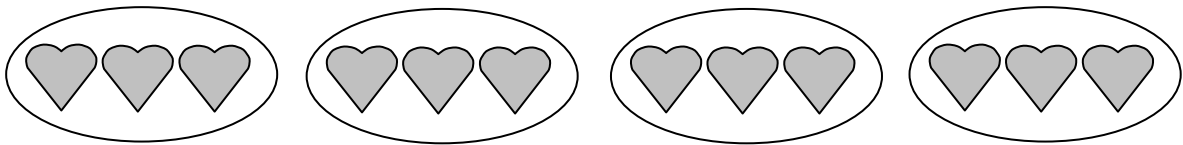
1.



$$\underline{\quad} + \underline{\quad} + \underline{\quad} = \underline{\quad}$$

$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$

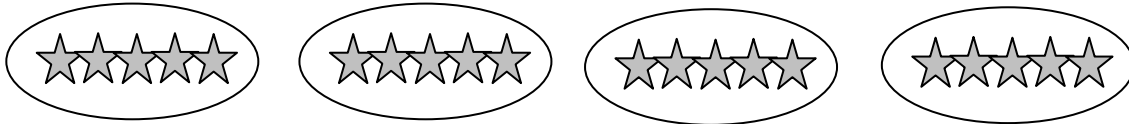
2.



$$\underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad} = \underline{\quad}$$

$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$

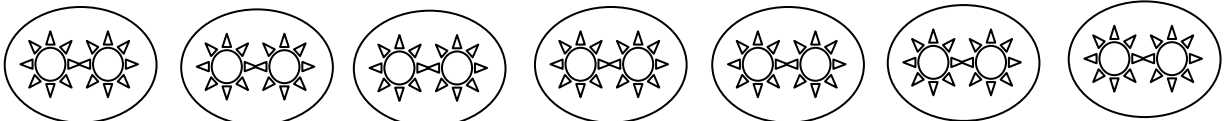
3.



$$\underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad} = \underline{\quad}$$

$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$

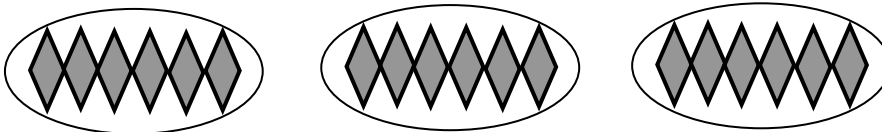
4.



$$\underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad} = \underline{\quad}$$

$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$

5.



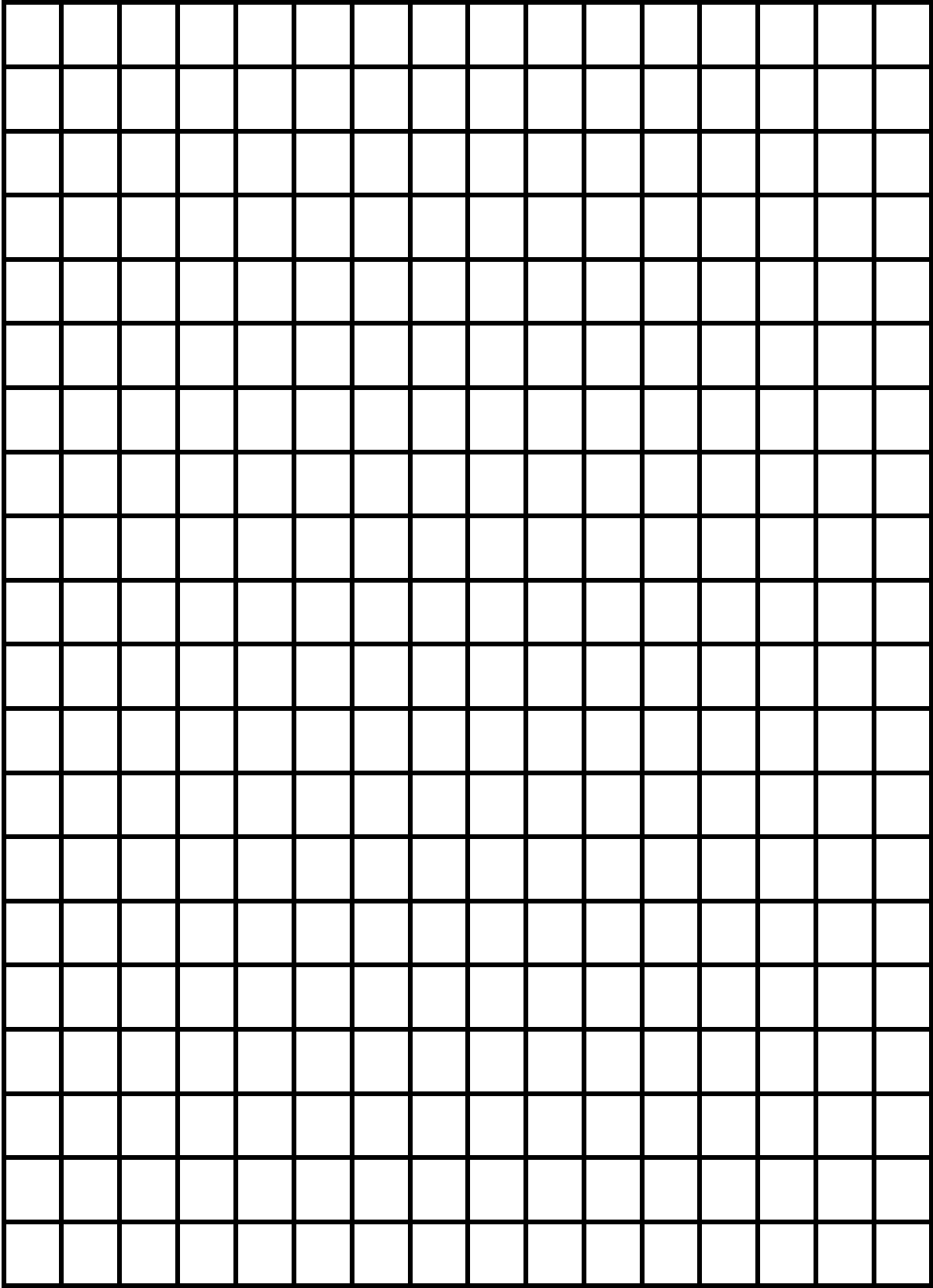
$$\underline{\quad} + \underline{\quad} + \underline{\quad} = \underline{\quad}$$

$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$

## Addition and Multiplication Numbers

Write the sum and then write the product for numbers 1-10. For numbers 11-15 write the sum and the multiplication number sentence.

1. $8 + 8 + 8 =$ _____	$3 \times 8 =$ _____
2. $10 + 10 + 10 + 10 + 10 + 10 + 10 + 10 + 10 + 10 =$ _____	$10 \times 10 =$ _____
3. $6 + 6 + 6 + 6 + 6 =$ _____	$5 \times 6 =$ _____
4. $1 + 1 + 1 + 1 =$ _____	$4 \times 1 =$ _____
5. $7 + 7 + 7 + 7 + 7 + 7 =$ _____	$6 \times 7 =$ _____
6. $4 + 4 + 4 + 4 + 4 + 4 + 4 =$ _____	$7 \times 4 =$ _____
7. $9 + 9 + 9 + 9 + 9 + 9 + 9 + 9 + 9 =$ _____	$9 \times 9 =$ _____
8. $1 + 1 =$ _____	$2 \times 1 =$ _____
9. $2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 =$ _____	$8 \times 2 =$ _____
10. $3 + 3 + 3 + 3 + 3 =$ _____	$5 \times 3 =$ _____
11. $9 + 9 + 9 + 9 + 9 =$ _____	___ $\times$ ___ = _____
12. $7 + 7 + 7 + 7 + 7 + 7 + 7 + 7 + 7 =$ _____	___ $\times$ ___ = _____
13. $10 + 10 + 10 + 10 =$ _____	___ $\times$ ___ = _____
14. $2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 =$ _____	___ $\times$ ___ = _____
15. $8 + 8 + 8 + 8 + 8 + 8 + 8 + 8 =$ _____	___ $\times$ ___ = _____



## Design a Cage

## Student Resource 6

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Design a Cage



My animal is a \_\_\_\_\_

Draw your cage below


My array is:

$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$

or

$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$

Explain why you chose the cage design drawn above.

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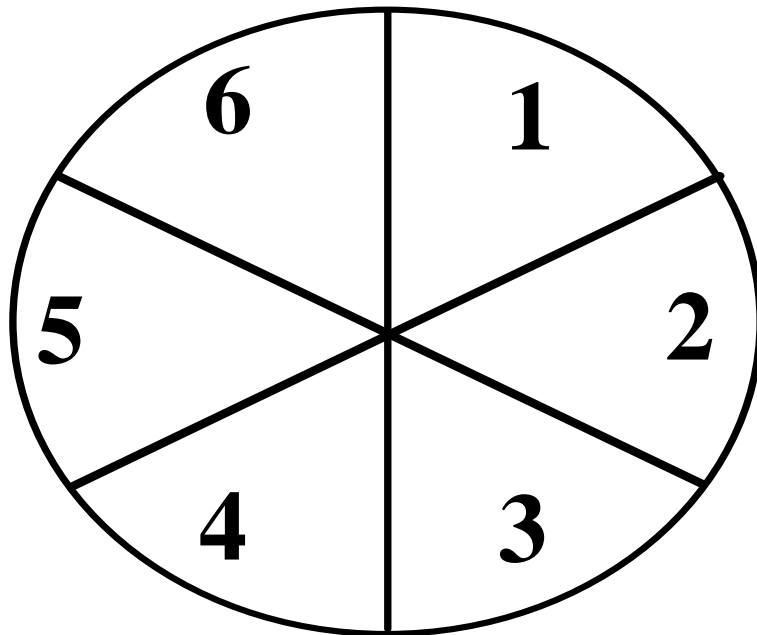
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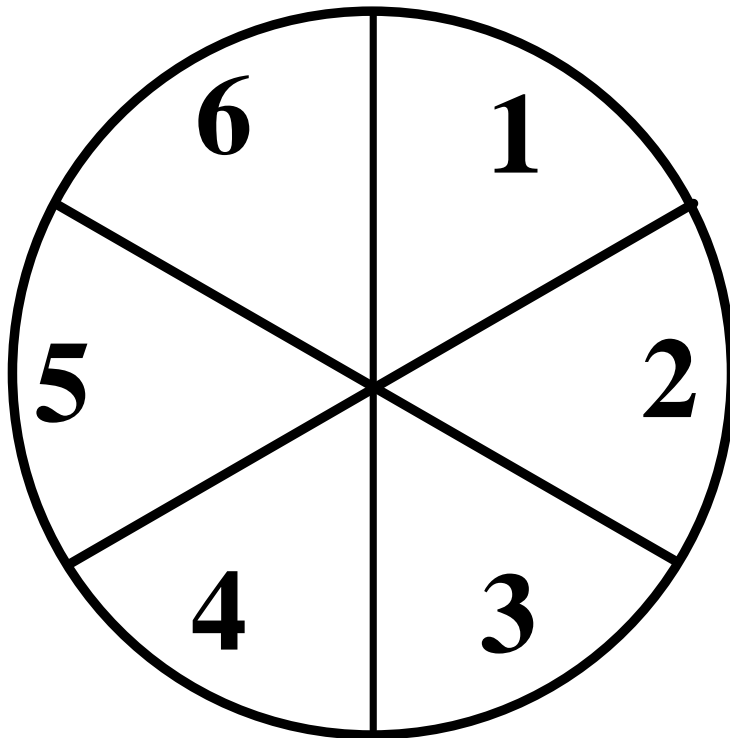
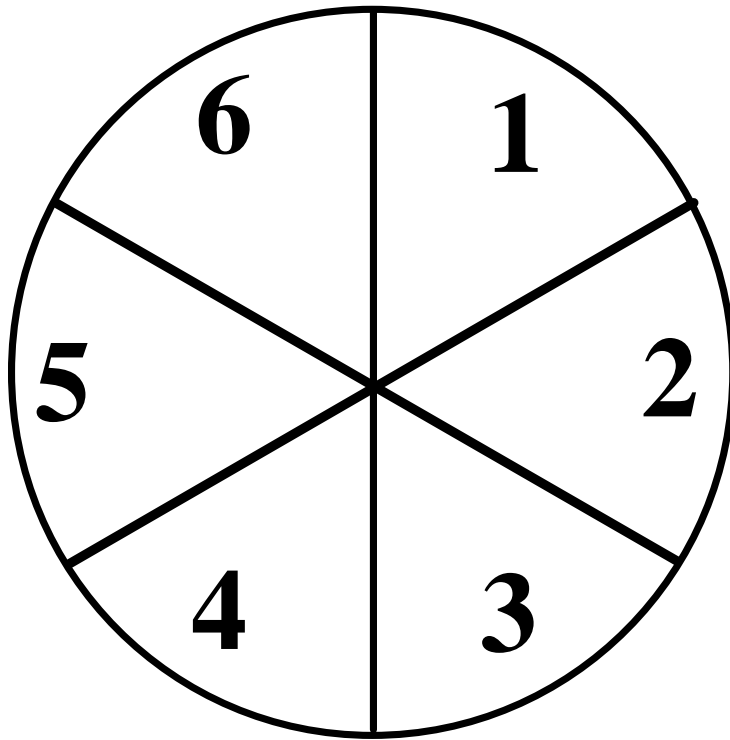
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### Cage Challenge Game Board

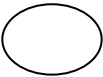
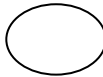
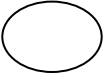
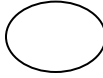
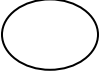
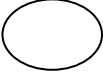
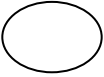

Player 1's CageA blank 10x10 grid for graphing, consisting of 10 columns and 10 rows of squares.Player 2's CageA blank 10x10 grid of squares, intended for drawing a picture.





# Student Resource 9

## Boxes and X's Recording Sheet

Player1	Player 2
<b>Round 1</b>	<b>Round 1</b>
<b>Draw:</b>	<b>Draw:</b>
<b>Addition:</b>	<b>Addition:</b>
_____	_____
<b>Multiplication:</b>	<b>Multiplication:</b>
_____ x _____ = 	_____ x _____ = 
<b>Round 2</b>	<b>Round 2</b>
<b>Draw:</b>	<b>Draw:</b>
<b>Addition:</b>	<b>Addition:</b>
_____	_____
<b>Multiplication:</b>	<b>Multiplication:</b>
_____ x _____ = 	_____ x _____ = 
<b>Round 3</b>	<b>Round 3</b>
<b>Draw:</b>	<b>Draw:</b>
<b>Addition:</b>	<b>Addition:</b>
_____	_____
<b>Multiplication:</b>	<b>Multiplication:</b>
_____ x _____ = 	_____ x _____ = 
Total: 	Total: 

## A Fish a Day

**The caretakers at the zoo are responsible for feeding the penguins. Each penguin is fed 5 fish a day. If there are 8 penguins, how many fish will be needed each day?**

**Step A:**

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**Step B:**

**Explain how you found your answer.**

**Use what you know about repeated addition or the array model in your explanation.**

**Use words and/or symbols in your explanation.**

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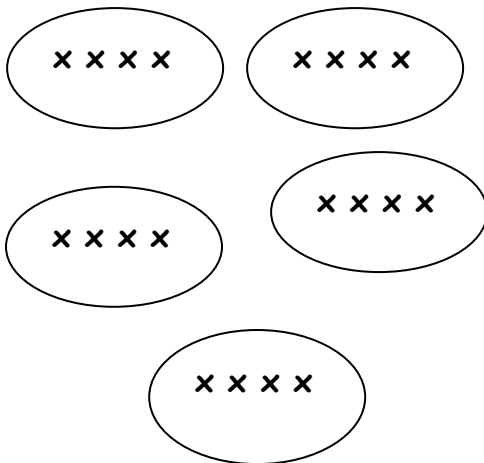
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**Name** \_\_\_\_\_ **Date** \_\_\_\_\_

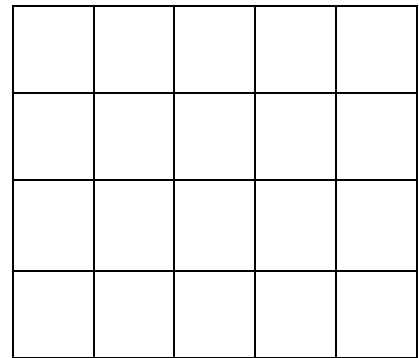
$$4 \times 5$$

Repeated Addition



$$4 + 4 + 4 + 4 + 4 = 20$$

Array



$$4 \times 5 = 20$$

## Visual Discovery



## Teacher Resource 2

### Visual Discovery

1. What do you see?
2. What do you think is happening?
3. How can we relate math to these pictures?

## Sample Arrays

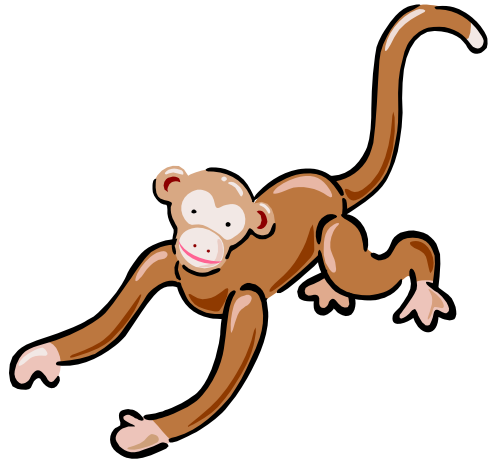
## Teacher Resource 3



## Animals for the Cages



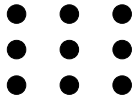
## Teacher Resource 4



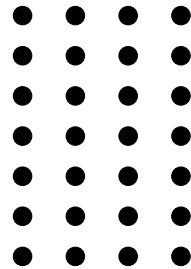
**I Have, Who Has?**

**Teacher Resource 5a**

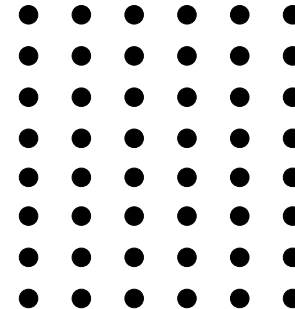
**I have 9.**



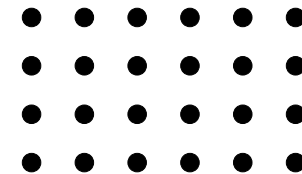
**Who has  $7 \times 4$ ?**



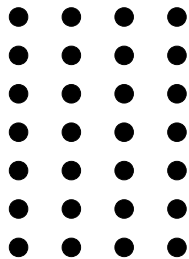
**I have 48.**



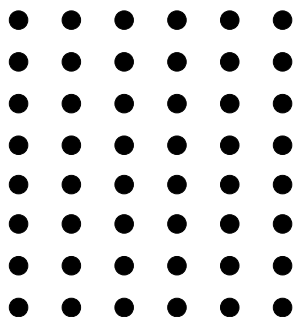
**Who has  $4 \times 6$ ?**



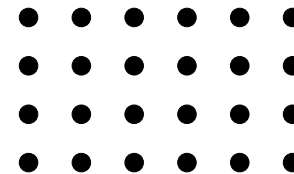
**I have 28.**



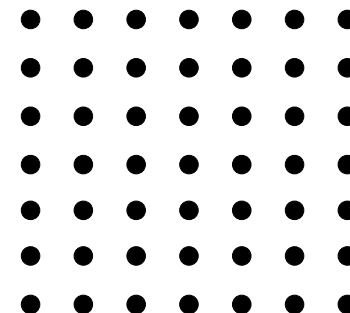
**Who has  $8 \times 6$ ?**



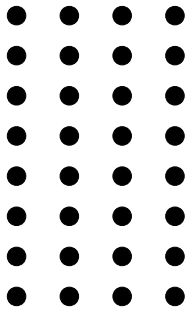
**I have 24.**



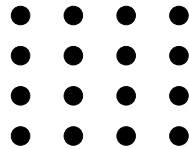
**Who has  $7 \times 7$ ?**



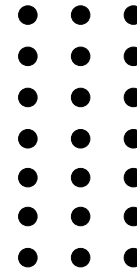
I have 32.



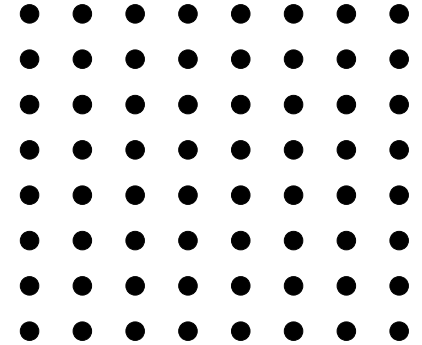
Who has  $4 \times 4$ ?



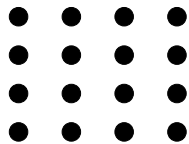
I have 21.



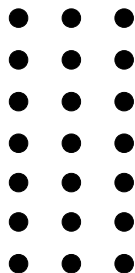
Who has  $8 \times 8$ ?



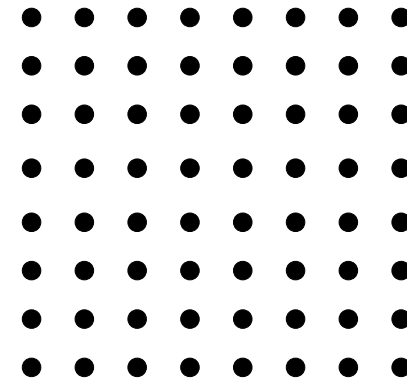
I have 16.



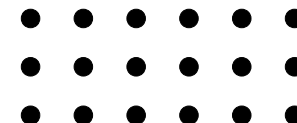
Who has  $7 \times 3$ ?



I have 64.

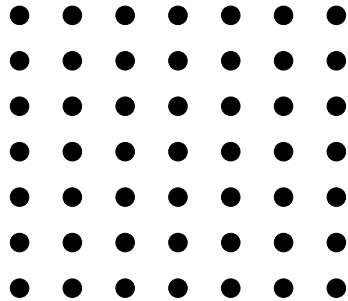


Who has  $3 \times 6$ ?

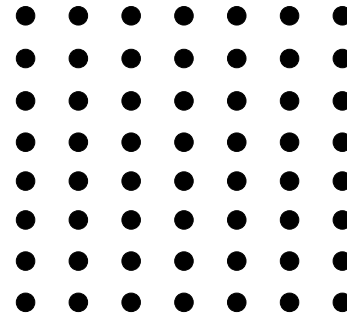




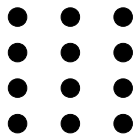
I have 49.



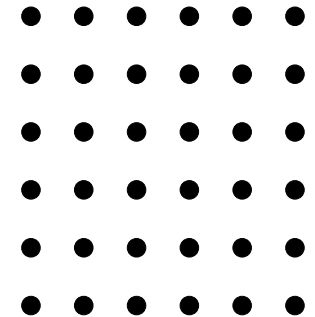
I have 56.



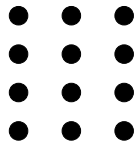
Who has  $4 \times 3$ ?



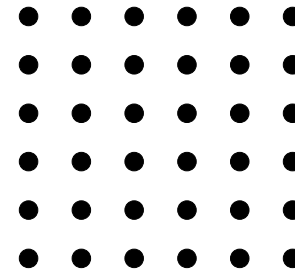
Who has  $6 \times 6$ ?



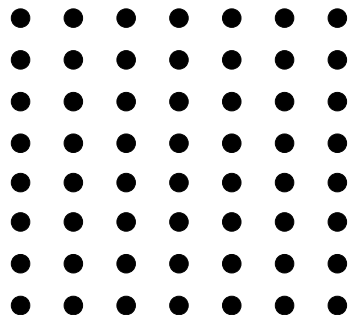
I have 12.



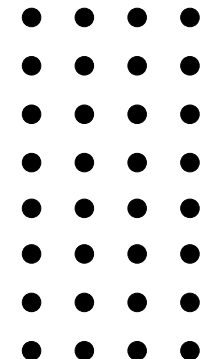
I have 36.



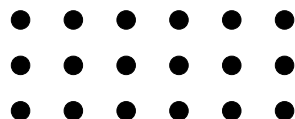
Who has  $8 \times 7$ ?



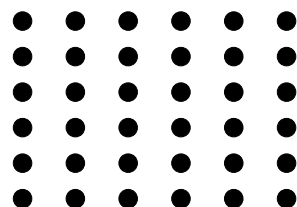
Who has  $8 \times 4$ ?



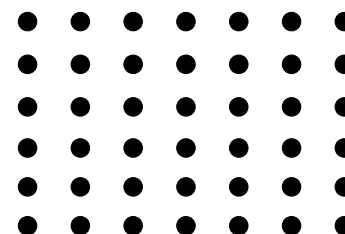
**I have 18.**



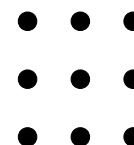
**Who has  $6 \times 7$ ?**



**I have 42.**



**Who has  $3 \times 3$ ?**



## Cage Challenge

Station #1

Student Resources 7 & 8

### **Directions:**

1. The person with the most letters in their first name goes first.
2. Player 1 spins the spinner two times.
3. Player 1 creates and colors in the array on their cage using those numbers.  
(One number is the row and the other number is the column.)
4. Player 2 repeats numbers 1-3 and colors in the arrays on their cage.
5. Players continue to take turns placing arrays on their own cage.
6. The first person to completely cover their cage or the player that has more of their cage covered at the end of the station wins the game.

## Problems at the Zoo

Station #2

Teacher Resources 7 & 12

### **Directions:**

1. You will need a pencil and an index card.
2. Spin the spinner and select a problem from the bowl with that number.
3. Read the problem and solve. (If needed use the materials provided to help.)
4. Show your work on the back of the problem and circle your answer.
5. Spin again to select a new problem.
6. Be sure to write your name on the problem.

## Boxes and X's

Station #3

Student Resource 9

### **Directions:**

1. The person with the least amount of letters in their first name goes first.
2. Roll one die and draw that many boxes (cages).
3. Roll the die a second time and place that many x's (animals) inside each box.
4. Write the appropriate addition and multiplication sentences. (Example: First roll is a 3 and the second roll is a 2. Draw 3 boxes with 2 x's in each box.

$$\text{Addition} = 2 + 2 + 2 = 6$$

$$\text{Multiplication} = 2 \times 3 = 6$$

5. Player 2 repeats directions 2-4 and continues taking turns.
6. At the end of three rounds each player adds up their products for each round and records the total at the bottom. The player with the highest total wins.

## **At the Zoo Problems**

- 1. On Monday, 3 classes from the third grade traveled to the zoo. If each class had 23 students, how many students went?**
- 2. At the food court, tables seating 4 people were available for outside eating. If 21 tables were filled, how many people ate outside?**
- 3. In the reptile exhibit there are 15 cages. If each cage holds 4 reptiles, how many reptiles are in that section of the zoo?**
- 4. Amanda visited the monkey exhibit and counted the monkeys by their legs. If she saw 22 monkeys, how many legs did she count?**
- 5. The fourth graders will be visiting the zoo in small groups. There will be 9 groups and each group will have 6 students. How many fourth graders will be going to the zoo?**

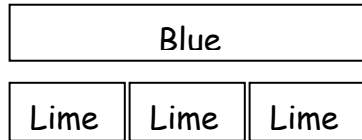
Name: \_\_\_\_\_ Answer Key \_\_\_\_\_

Date: \_\_\_\_\_

## Repeating Rods

For each rod below, draw the rods that will make the same length. Label each rod by color. Write the number sentences on the lines.

Example:



**Addition Number Sentence:**  $(3 + 3 + 3 = 9)$

**Multiplication Number Sentence:**  $(3 \times 3 = 9)$

<p>1. <div style="border: 1px solid black; display: inline-block; padding: 2px 10px; margin: 5px;">Orange</div></p> <p>Any combination that equals 10</p> <p><b>Addition Number Sentence:</b> _____</p> <p><b>Multiplication Number Sentence:</b> _____</p>	<p>2. <div style="border: 1px solid black; display: inline-block; padding: 2px 10px; margin: 5px;">Brown</div></p> <p>Any combination that equals 8</p> <p><b>Addition Sentence:</b> _____</p> <p><b>Multiplication Number Sentence:</b> _____</p>
<p>3. <div style="border: 1px solid black; display: inline-block; padding: 2px 10px; margin: 5px;">Dark Green</div></p> <p>Any combination that equals 6</p> <p><b>Addition Number Sentence:</b> _____</p> <p><b>Multiplication Number Sentence:</b> _____</p>	<p>4. <div style="border: 1px solid black; display: inline-block; padding: 2px 10px; margin: 5px;">Red</div></p> <p>Any combination that equals 2</p> <p><b>Addition Number Sentence:</b> _____</p> <p><b>Multiplication Number Sentence:</b> _____</p>

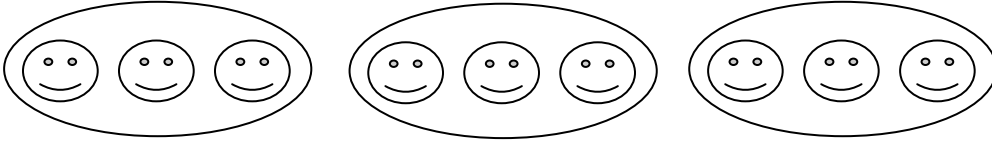
**Challenge: How many ways can you represent the number 36 as repeated addition? Record your answer below.**

Answers will vary.

# Addition and Multiplication Pictures- Answer Key

Complete the addition number sentence and the related multiplication number sentence.

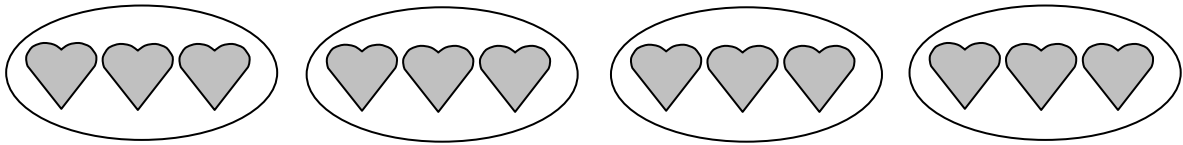
1.



$$\underline{3} + \underline{3} + \underline{3} = \underline{9}$$

$$\underline{3} \times \underline{3} = \underline{9}$$

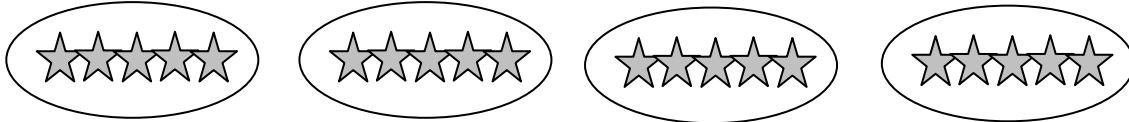
2.



$$\underline{3} + \underline{3} + \underline{3} + \underline{3} = \underline{12}$$

$$\underline{3} \times \underline{4} = \underline{12}$$

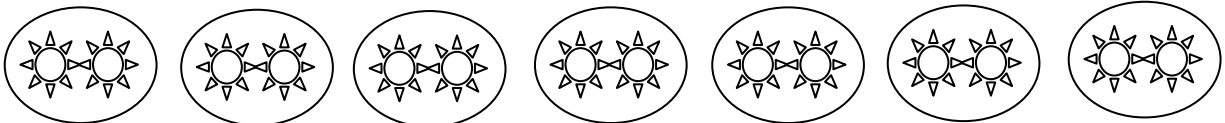
3.



$$\underline{5} + \underline{5} + \underline{5} + \underline{5} = \underline{20}$$

$$\underline{5} \times \underline{4} = \underline{20}$$

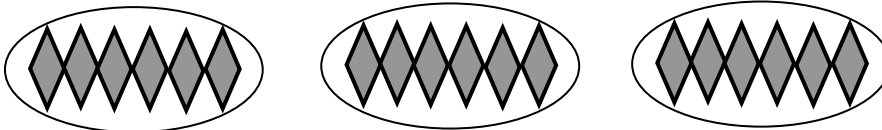
4.



$$\underline{2} + \underline{2} + \underline{2} + \underline{2} + \underline{2} + \underline{2} + \underline{2} = \underline{14}$$

$$\underline{2} \times \underline{7} = \underline{14}$$

5.



$$\underline{6} + \underline{6} + \underline{6} = \underline{18}$$

$$\underline{6} \times \underline{3} = \underline{18}$$

## Addition and Multiplication Answer Key

Write the sum and then write the product.

1. $8 + 8 + 8 =$ <u>24</u>	$3 \times 8 =$ <u>24</u>
2. $10 + 10 + 10 + 10 + 10 + 10 + 10 + 10 + 10 + 10 =$ <u>100</u>	$10 \times 10 =$ <u>100</u>
3. $6 + 6 + 6 + 6 + 6 =$ <u>30</u>	$5 \times 6 =$ <u>30</u>
4. $1 + 1 + 1 + 1 =$ <u>4</u>	$4 \times 1 =$ <u>4</u>
5. $7 + 7 + 7 + 7 + 7 + 7 =$ <u>42</u>	$6 \times 7 =$ <u>42</u>
6. $4 + 4 + 4 + 4 + 4 + 4 + 4 =$ <u>28</u>	$7 \times 4 =$ <u>28</u>
7. $9 + 9 + 9 + 9 + 9 + 9 + 9 + 9 + 9 =$ <u>81</u>	$9 \times 9 =$ <u>81</u>
8. $1 + 1 =$ <u>2</u>	$2 \times 1 =$ <u>2</u>
9. $2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 =$ <u>16</u>	$8 \times 2 =$ <u>16</u>
10. $3 + 3 + 3 + 3 + 3 =$ <u>15</u>	$5 \times 3 =$ <u>15</u>
11. $9 + 9 + 9 + 9 + 9 =$ <u>45</u>	$5 \times 9 =$ <u>45</u>
12. $7 + 7 + 7 + 7 + 7 + 7 + 7 + 7 + 7 =$ <u>63</u>	$9 \times 7 =$ <u>63</u>
13. $10 + 10 + 10 + 10 =$ <u>40</u>	$4 \times 10 =$ <u>40</u>
14. $2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 =$ <u>20</u>	$10 \times 2 =$ <u>20</u>
15. $8 + 8 + 8 + 8 + 8 + 8 + 8 + 8 =$ <u>64</u>	$8 \times 8 =$ <u>64</u>

A Fish a Day  
Answer Key

**The caretakers at the zoo are responsible for feeding the penguins. Each penguin is fed 5 fish a day. If there are 8 penguins, how many fish will be needed each day?**

40 fish

---

**Explain how you found your answer.**

**Use what you know about repeated addition or the array model in your explanation.**

**Use words and/or symbols in your explanation.**

Answers will vary

The student should explain why they used the particular strategy and how it helped solve their problem.

Sample strategies:

$$5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 = 40$$

or

an array  $5 \times 8$  or  $8 \times 5 = 40$

Name \_\_\_\_\_ Date \_\_\_\_\_